

WHAT IS CLAIMED IS:

1. A recording apparatus which performs recording on  
a recording medium while repeating a main scanning operation  
5 of record-scanning with a recording head having a plurality  
of recording elements arrayed in a predetermined direction,  
in a main scanning direction substantially orthogonal to  
the predetermined direction, and a sub scanning operation  
of relatively moving the recording head and the recording  
10 medium in a sub scanning direction orthogonal to the main  
scanning direction, comprising:

shift means capable of shifting, by a magnitude  
corresponding to a designated number of the recording  
elements, recording data stored in a buffer memory, and  
15 then transferring the recording data to said recording head;  
and

control means for controlling said shift means so that,  
in a case where a region which cannot be record-scanned  
by said recording head exists in a region near an end part  
20 of said recording medium in the sub scanning direction,  
and where a relative position of said recording head and  
said recording medium in said sub scanning direction cannot  
be renewed, said recording data to be transferred to said  
recording head may be shifted by said shift means onto a  
25 side of the region which cannot be record-scanned in said  
sub scanning direction.

2. A recording apparatus as defined in claim 1,  
wherein:

in a case where the recording is performed by relatively  
moving said recording medium every stipulated movement  
5 amount  $n$  in said sub scanning direction each time the  
record-scanning is performed in the main scanning direction  
by said recording head whose recording elements number  $N$ ,  
and where said recording can be started only from a position  
which is shifted by a heading amount  $X$  from a front end  
10 of said recording medium in said sub scanning direction,  
said control means controls said shift means;

so that, in a case where an accumulative value obtained  
by accumulating the stipulated movement amount  $n$  from zero  
every record-scanning is less than the heading amount  $X$   
15 and where a difference between said heading amount  $X$  and  
the accumulative value is not less than said stipulated  
movement amount  $n$ , such record-scannings may be repeated  
by shifting said recording data onto a side of the region  
which cannot be record-scanned in said sub scanning  
20 direction in correspondence with the difference between  
said heading amount  $X$  and said accumulative value by said  
shift means, without relatively moving said recording  
medium;

that, in a case where said accumulative value is less  
25 than said heading amount  $X$  and where said difference between  
said heading amount  $X$  and said accumulative value is less  
than said stipulated movement amount  $n$ , said recording

medium may be relatively moved in correspondence with said difference between said heading amount X and said accumulative value after said record-scanning; and

that the record-scannings may be thereafter repeated  
5 by relatively moving said recording medium every stipulated movement amount n in said sub scanning direction, without shifting said recording data by said shift means.

3. A recording apparatus as defined in claim 1,  
10 wherein:

after said recording medium has become incapable of the relative movement of said stipulated movement amount n at a rear end of said recording medium in said sub scanning direction, said control means controls said shift means;  
15 so that, before a difference between an accumulative value obtained by accumulating a stipulated movement amount n from zero every record-scanning from a head of said recording medium and a movement execution amount from the head of said recording medium exceeds the number N of the  
20 recording elements of said recording head, such record-scannings may be repeated by shifting said recording data onto a side of the region which cannot be record-scanned in said sub scanning direction in correspondence with the difference between the accumulative value and the movement  
25 execution amount by said shift means.

4. A recording apparatus, comprising:

record means for performing recording on a recording medium while repeating a main scanning operation of record-scanning with a recording head having a plurality of recording elements arrayed in a predetermined direction, in a main scanning direction substantially orthogonal to said predetermined direction, and a sub scanning operation of moving the recording medium in a sub scanning direction orthogonal to the main scanning direction;

a first paper feed port into which said recording medium is set from an upper stream side in a conveyance direction of said recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording medium in direction the same as the conveyance direction in the recording mode;

a second paper feed port into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction reverse to said conveyance direction of said recording medium in said recording mode; and

control means for performing a control in case of performing the edge positioning operation by setting said recording medium into said second paper feed port, so that, in a region which lies in a region near an end part of said recording medium on the lower stream side in said conveyance direction in said recording mode and which cannot be

record-scanned by said recording head, recording data may be shifted onto a side of the region which cannot be record-scanned in the sub scanning direction and may be then transferred to said recording head.

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5. A recording apparatus which performs recording on a recording medium while repeating a main scanning operation of record-scanning with a recording head having N recording elements, in a main scanning direction, and a sub scanning  
10 operation of relatively moving the recording head and the recording medium every stipulated movement amount n in a sub scanning direction orthogonal to the main scanning direction, comprising:

a first counter which stores therein a relative movement  
15 amount from a head of said recording medium;

a second counter which stores therein a logical recording position from the head of said recording medium;

shift means capable of shifting, by a magnitude corresponding to a designated number of the recording  
20 elements, a recording pattern stored in a buffer memory, and then transferring the recording pattern to said recording head; and

control means for controlling the relative movement of said recording medium, the record-scanning of said  
25 recording head, counts of the first and second counters, and the shift in said shift means;

wherein said control means performs the control:

so that, at start of recording for said recording medium,  
the recording may be started upon relatively moving said  
recording medium to a position which is shifted onto a lower  
stream side in a moving direction, by a heading amount X  
5 from top edge of said medium, and setting said first counter  
and said second counter at X and "0", respectively;

that, at every record-scanning, in a case where values  
of said first counter and said second counter are equal,  
a regular recording may be performed, and in a case where  
10 the values are not equal, the record-scanning may be  
performed by shifting the recording data onto the lower  
stream side in the moving direction, in correspondence with  
a difference d between the values of the first and second  
counters by said shift means; and

15 that, after the record-scanning, in a case where the  
difference d is less than the stipulated movement amount  
n,  $(n - d)$  may be added to the value of said first counter  
by moving said recording medium by  $(n - d)$  in the sub scanning  
direction, that, in a case where said difference d is not  
20 less than said stipulated movement amount n, the movement  
control may be performed so as not to perform the relative  
movement operation of said recording medium in said sub  
scanning direction, and that said second counter may add  
up the stipulated movement amounts n irrespective of  
25 existence or nonexistence or a movement amount of said  
movement operation of said recording medium.

6. A recording apparatus as defined in claim 5, wherein  
said control means performs said control so as not to perform  
said record-scanning in the processing of every  
record-scanning, in a case where said difference d between  
5 said values of said first counter and said second counter  
is not less than the number N of said recording elements  
of said recording head.

7. A recording apparatus as defined in claim 5, further  
10 comprising a first paper feed port into which said recording  
medium is set from an upper stream side in a conveyance  
direction of said recording medium in a recording mode,  
so as to perform an edge positioning operation by conveying  
said recording medium in a direction the same as the  
15 conveyance direction in the recording mode, and a second  
paper feed port into which said recording medium is set  
from a lower stream side in said conveyance direction of  
said recording medium in said recording mode, so as to perform  
an edge positioning operation by conveying said recording  
20 medium in a reverse direction to said conveyance direction  
of said recording medium in said recording mode;

wherein the heading amount X differs depending upon  
the sort of the paper feed port to-be-used.

25 8. A recording apparatus as defined in claim 2, wherein  
said heading amount X differs in accordance with a size  
of the recording medium to-be-used.

9. A method of controlling a recording apparatus which performs recording on a recording medium while repeating a main scanning operation of record-scanning a recording head having a plurality of recording elements arrayed in a predetermined direction, in a main scanning direction substantially orthogonal to the predetermined direction, and a sub scanning operation of relatively moving the recording head and the recording medium in a sub scanning direction orthogonal to the main scanning direction, comprising a control step including the step of:

shifting recording data onto a side of a region which cannot be record-scanned in the sub scanning direction, by a magnitude corresponding to a designated number of the recording elements, and then transferring the recording data to the recording head, in a case where the region which cannot be record-scanned by said recording head exists in a region near an end part of the recording medium in said sub scanning direction, and where a relative position of said recording head and said recording medium in said sub scanning direction cannot be renewed.

10. A method of controlling a recording apparatus as defined in claim 9, wherein:

in a case where the recording is performed by relatively moving said recording medium every stipulated movement amount  $n$  in said sub scanning direction each time the



record-scanning is performed in the main scanning direction by said recording head whose recording elements number N, and where the print recording can be started only from a position which is shifted by a heading amount X from a front  
5 end of said recording medium in said sub scanning direction, said control step proceeds;

so that, in a case where an accumulative value obtained by accumulating the stipulated movement amount n from zero every record-scanning is less than the heading amount X  
10 and where a difference between said heading amount X and the accumulative value is not less than said stipulated movement amount n, such record-scannings may be repeated by shifting said recording data onto a side of the region which cannot be record-scanned in said sub scanning  
15 direction in correspondence with the difference between said heading amount X and said accumulative value by said shift means, without relatively moving said recording medium;

that, in a case where said accumulative value is less  
20 than said heading amount X and where said difference between said heading amount X and said accumulative value is less than said stipulated movement amount n, said recording medium may be relatively moved in correspondence with said difference between said heading amount X and said  
25 accumulative value after said record-scanning; and

that the record-scannings may be thereafter repeated by relatively moving said recording medium every stipulated

movement amount  $n$  in said sub scanning direction, without shifting said recording data by said shift means.

11. A method of controlling a recording apparatus as  
5 defined in claim 9, wherein:

after said recording medium has become incapable of the relative movement of said stipulated movement amount  $n$  at a rear end of said recording medium in said sub scanning direction, said control step proceeds;

10 so that, before a difference between an accumulative value obtained by accumulating a stipulated movement amount  $n$  from zero every record-scanning from a head of said recording medium and a movement execution amount from the head of said recording medium exceeds the number  $N$  of the  
15 recording elements of said recording head, such record-scannings may be repeated by shifting said recording data onto a side of the region which cannot be record-scanned in said sub scanning direction in correspondence with the difference between the accumulative value and the movement  
20 execution amount by said shift means.

12. A method of controlling a recording apparatus, having:

a first paper feed port into which a recording medium  
25 is set from an upper stream side in a conveyance direction of the recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording

medium in a direction the same as the conveyance direction in the recording mode;

5 a second paper feed port into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction reverse to said conveyance direction of said recording medium in said recording mode; and

10 recording means for performing recording on said recording medium while repeating a main scanning operation of record-scanning a recording head having a plurality of recording elements arrayed in a predetermined direction, in a main scanning direction substantially orthogonal to  
15 said predetermined direction, and a sub scanning operation of moving said recording medium in a sub scanning direction orthogonal to the main scanning direction; comprising the step of:

performing a control in case of performing the edge  
20 positioning operation by setting said recording medium into said second paper feed port, so that, in a region which lies in a region near an end part of said recording medium on the lower stream side in said conveyance direction in said recording mode and which cannot be record-scanned by  
25 the recording head, recording data may be shifted onto a side of the region which cannot be record-scanned in the sub scanning direction and may be then transferred to said

recording head.

13. A method of controlling a recording apparatus which performs recording on a recording medium while repeating  
5 a main scanning operation of record-scanning with a recording head having N recording elements, in a main scanning direction, and a sub scanning operation of relatively moving the recording head and the recording medium every stipulated movement amount n in a sub scanning  
10 direction orthogonal to the main scanning direction, and which has:

a first counter which stores therein a relative movement amount from a head of said recording medium;

a second counter which stores therein a logical  
15 recording position from the head of said recording medium; and

shift means capable of shifting, by a magnitude corresponding to a designated number of the recording elements, a recording pattern stored in a buffer memory,  
20 and then transferring the recording pattern to said recording head; comprising:

the control step of controlling the relative movement of said recording medium, the record-scanning of said recording head, counts of the first and second counters,  
25 and the shift in said shift means;

wherein said control step performs the control:

so that, at start of recording for said recording medium,

the recording may be started upon relatively moving said recording medium to a position which is shifted onto a lower stream side in a moving direction, by a heading amount X from top edge of said medium, and setting said first counter  
5 and said second counter at X and "0", respectively;

that, at every record-scanning, in a case where values of said first counter and said second counter are equal, a regular recording may be performed, and in a case where the values are not equal, the record-scanning may be  
10 performed by shifting the recording data onto the lower stream side in the moving direction, in correspondence with a difference d between the values of the first and second counters by said shift means; and

that, after the record-scanning, in a case where the  
15 difference d is less than the stipulated movement amount n,  $(n - d)$  may be added to the value of said first counter by moving said recording medium by  $(n - d)$  in the sub scanning direction, that, in a case where said difference d is not less than said stipulated movement amount n, the movement  
20 control may be performed so as not to perform the relative movement operation of said recording medium in said sub scanning direction, and that said second counter may add up the stipulated movement amounts n irrespective of existence or nonexistence or a movement amount of said  
25 movement operation of said recording medium.

14. A method of controlling a recording apparatus as

defined in claim 13, wherein said control step performs said control so as not to perform said record-scanning in the processing of every record-scanning, in a case where said difference d between said values of said first counter and said second counter is not less than the number N of said recording elements of said recording head.

15. A method of controlling a recording apparatus as defined in claim 11, wherein the recording apparatus further has a first paper feed port into which said recording medium is set from an upper stream side in a conveyance direction of said recording medium in a recording mode, so as to perform an edge positioning operation by conveying said recording medium in a direction the same as the conveyance direction in the recording mode, and a second paper feed port into which said recording medium is set from a lower stream side in said conveyance direction of said recording medium in said recording mode, so as to perform an edge positioning operation by conveying said recording medium in a reverse direction to said conveyance direction of said recording medium in the print recording mode; and

wherein the heading amount X differs depending upon the sort of the paper feed port to-be-used, at said control step.

16. A method of controlling a recording apparatus as defined in claim 10, wherein said heading amount X differs

in accordance with a size of the recording medium to be used,  
at said control step.

17. A control program which is run for performing a  
5 method of controlling a recording apparatus as defined in  
claim 9.

18. A storage medium in which a control program as  
defined in claim 17 is stored in computer-readable manner.